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AUTHOR Orth, Mollie N.
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ABSTRACT

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DEPARTMENT OF DEFENSE CURRICULA: FEASIBILITY
OF CONVERSION FOR VOCATIONAL EDUCATION

Mollie N. Orth

The Ohio State University
The National Center for Research
in Vocational Education
1960 Kenny Road
Columbus, Ohio 43210

U.S. DEPARTMENT OF HEALTH,
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To provide information on the feasibility of conversion of military-developed curriculum materials for vocational education, this study evaluated twenty military courses in one of three occupational areas: allied health, environmental health, and occupational health. Selection of the occupations was based on national curriculum need, applicability to vocational education, and availability of military course materials. Two project-developed review guidelines were used by subject matter and curriculum specialists to evaluate each course. The review guideline topics were based on the Instructional Systems Design concept of curriculum development. The majority of the courses reviewed were determined to be suitable for conversion.

DEPARTMENT OF DEFENSE CURRICULA: FEASIBILITY
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Background

The United States military is one of the largest occupational training agencies in the country. A publication produced by the Department of Defense has identified over 400 enlisted military occupations for which there are civilian counterparts (Department of Defense 1978). According to revised Bureau of Labor Statistics' occupational projections to 1985, employment in the professional and technical group is expected to rise from 12.3 million in 1974 to 16 million in 1985. Craft and kindred workers' employment is expected to increase from 11.5 million to 13.8 million by 1985, and operatives' employment is projected to increase from 13.9 million to 15.2 million (Carey 1976). Using military materials could reduce financial waste and increase civilian program efficiency (Budke 1976). Especially with the economic cutbacks we are seeing today, the idea of adapting military-developed technical training for civilian use is becoming a more attractive and feasible option. This idea is supported by several factors: (1) the continuing need by civilian vocational educators for high quality curriculum materials; (2) the success of the U.S. military services in training personnel in new and emerging occupations; and (3) the ability of the military to concentrate extensive resources on rigorous development of instructional materials.

An example of an occupation and a curriculum program which emerged in the military and then transferred to the civilian sector is the occupation of Biomedical Equipment Technician (BMET). A BMET training program was established by the Air Force in 1957, building on an Army Medical Equipment Maintenance training program begun in 1942. Since 1965, when the Association for the Advancement of Medical Instrumentation was founded, the BMET occupation and related training programs have become established in the civilian sector. These programs use the military training programs as a basis for job duties and curriculum materials (Technical Education Reporter 1974).

Past research shows that the use of military curricula in the civilian sector has been piecemeal in nature. This has been true even though using the existing military curricula instead

of developing new ones could have resulted in considerable savings in terms of time and money. Civilian instructors have used military materials primarily as a supplement to other curriculum, when they were able to acquire materials. Oftentimes the civilian users of military curricula had been in the military themselves at some time. They either saved the materials from their military days or knew of contacts from whom they could request military curriculum materials as needed (Lewis 1971).

Research conducted by W. Lewis and A. Lewis of the Virginia Polytechnic Institute and State University in 1970 indicated that vocational educators want to have access to military curriculum materials related to their program areas (Lewis and Lewis 1971). This was substantiated by a survey conducted by W. Budke at the National Center for Research in Vocational Education in 1975 (Budke 1976). Several organizations have attempted to respond to this need by providing military curriculum materials in their original form. A familiar example would be The National Laboratory for the Advancement of Education, a division of the Aerospace Education Foundation (AEF), a clearinghouse initiated in 1972. The laboratory has an extensive listing of military curricula, including support materials in a variety of occupations. Their catalog is expanded each year. A second example is the Military Clearinghouse at the National Center for Research in Vocational Education initiated in August, 1977. While the National Center Military Clearinghouse does not duplicate the activities of the AEF, the objectives are similar--to provide military curriculum materials at a reasonable cost to civilian educators and trainers. A third source is the Community College of the Air Force. The college provides a limited amount of Air Force military curriculum materials to civilians upon request.

Feasibility of Conversion

All of the above mentioned sources provide military curriculum to civilians in its original form. The question could arise as to whether military curriculum materials could be better utilized if they were in a modified, more "civilianized" form?

This question was included in a research project done at the National Center for Research in Vocational Education, under a contract with the Bureau of Occupational and Adult Education, U.S. Office of Education in 1978 (Forgione and Orth 1979). This paper is based on conclusions of that research project. The objectives of the research were (1) to determine the feasibility of conversion of military curriculum; and (2) if feasible, to provide national planners and policy makers with information to assist them in setting national priorities for the conversion of Department of Defense curricula to civilian use.

A fundamental assumption of the project staff conducting the research was that curriculum modification requires, on the conceptual level, the same components as those used in the original development of the curriculum. "Curriculum development" was defined as the process of identifying what is to be learned (the content) and how it is to be presented (the instructional methods). "Conversion" indicates a developer's use of some or all components of curriculum already developed for other than their original purpose(s) or audience(s). Conversion was assumed to be a viable form of curriculum development if it was less time consuming and/or less costly than developing curriculum material "from scratch."

Evaluation of Military Curricula

To determine the feasibility of converting the military curriculum to vocational education uses, the military curricula were evaluated in terms of their own developmental process. Curriculum components and their arrangement were assessed in a systematic manner in order to identify the strengths and weaknesses of a given curriculum. The assessment also had to be conducted and presented in such a way as to be useful to the primary users (national planning and policy makers) and yet provide information to curriculum developers and instructors (the potential converters of military curricula).

Two review guides were developed for screening and evaluating the military curriculum materials. The topics included in the review guides were derived from an analysis of the components of curriculum development as contained in the Instructional System Design (ISD) model developed and field-tested by the Instructional Materials Laboratory at The Ohio State University (1972). The Ohio State ISD model includes the three major elements of occupational research, educational requirements, and organization/instruction. Contained within these major elements are components of (a) identification of needs, (b) task list, (c) occupational analysis, (d) course outline, (e) final outline, (f) course of study, (g) objectives, (h) strategies, (i) sequence, (j) grouping/scheduling, (k) related content, (l) lesson plan and instruction, (m) evaluation, and (n) revision. Additional topics not included in the ISD model but incorporated into the review guides dealt with special needs and special adaptation considerations such as organizational patterns, equipment and facility requirements, and community resources needed. The review guidelines contained both a question section and a narrative section.

Format and items on the military review guides were prepared to reflect the components of the ISD model. Sample question formats and concomitant response modes for the review guides were taken from previously-developed curriculum assessment instruments.

These instruments included (a) the Career Education Materials Assessment Instrument developed by Peat, Marwick, Mitchell, and Company (1974), (b) the Instructional Materials Assessment Survey developed by the state of Florida (1977), and (c) the Course Review Summary developed by the Military Curricula Project at the National Center for Research in Vocational Education (Budke 1976), and to a lesser degree, several other instruments.

Specific review guide items were generated in a two-day instrument workshop. Attending were two project staff and an outside consultant with training and experience in vocational curriculum development and evaluation. The general format selected was one of specific section questions leading into section narrative responses for each major topic. The overall objective was to obtain reviewers' judgmental comments regarding the feasibility of converting military courses for use in vocational education. The question section was primarily developed to direct a reviewer's thinking. Although the responses were particularly useful when the reviewer's comments were sparse, no statistical analysis of the items was conducted.

It was decided to develop two different guides in order to respond to the nature of the military curriculum materials available and the reviewing process itself. A preliminary review guide consisting of seven major parts was to be used for the initial screening of the course Plan (or Program) of Instruction (POI). The preliminary review guide generally asked questions which could be answered from studying the POI. The seven topics were (1) major aims/goals, (2) specific course objectives, (3) lesson/unit objectives, (4) instructional methods, (5) versatility and special needs considerations, (6) special conditions for use, and (7) overall judgments/reactions.

For military curricula receiving favorable reviews on the first screening, an enlarged, second military curriculum review guide was developed. This second review guide was similar to the first but included two new sections on (a) instructional materials, and (b) assessment and evaluation. The second review guide was expanded since the reviewer was seeing the actual military curriculum materials used to teach the course and not just the course outline. The format of both review guides paralleled, as closely as possible, the presentation of information in the curriculum itself.

Three consultants--two instructors in the particular occupational area in the civilian sector and a curriculum development specialist--evaluated each of the courses using the review guidelines. The information provided on each course represented a consolidation of the consultants' responses.

For purposes of reporting to the U.S. Office of Education, information on eleven components of curriculum development or conversion was provided in graphic and narrative form. A reporting format different from the evaluation format used in the review guidelines was chosen to reflect the concept of conversion as defined by the project. The eleven components were (1) curriculum need, (2) course goals and objectives, (3) lesson objectives, (4) technical accuracy of instructional materials, (5) material adequacy to meet objectives, (6) instructional and management strategies, (7) ease of adaptation, (8) incorporation of special needs, (9) absence of copyrighted materials, (10) assessment and evaluation criteria, and (11) safety and other job attitudes. The components were categorized in three degrees of importance with respect to curriculum development or conversion: (a) critical, (b) important, and (c) nice-to-have. Three possible response values were provided for each of the components: (a) strong, (b) moderate, or (c) weak. A summary rating of the reviewers' overall evaluation was also provided.

Identification of Courses to be Reviewed

If the use of military-developed curriculum materials in the civilian sector was to be facilitated, it was first necessary to identify national civilian curriculum needs, and then to identify military materials which might satisfy those needs. Finally, identified courses were reviewed to provide information regarding existing strengths and necessary modifications.

National civilian curriculum development needs were identified prior to the selection and review of relevant military courses. Priority occupational areas for which there might be a curriculum need were identified based on an analysis of three important sources: (a) occupations cited in the federal vocational education legislation (Public Law 94-482); (b) large, high growth civilian employment occupational areas listed in the Bureau Labor Statistics' occupational projections for 1985 (Carey 1976; Bureau of Labor Statistics 1978); and (c) new and changing occupational areas identified by a companion National Center project entitled Curriculum Development Needs for Vocational Education: New and Changing Occupational Areas (Forgione and Kopp 1979). A total of ninety-nine candidate occupations were identified from these three sources. The list of occupations was further refined by selecting only the occupations (1) which required less than a baccalaureate degree according to the definition of vocational education in the 1976 Amendments (PL 94-482); and (2) for which relevant military courses (Army, Air Force, Navy, or Marine Corps) had been identified. Thirty-five occupations were finally selected as the target occupations for which military curriculum materials were requested.

Access to the military curriculum materials was provided through a Joint Memorandum of Understanding between the Department of Defense and the U.S. Office of Education. Individual course materials identified in the review of the formal schools' catalogs were acquired through established Department of Defense liaisons to the National Center for Research in Vocational Education.

Results of the Evaluation of Military Courses

Twenty courses were selected for intensive review. The courses represented three general occupational areas: allied health, environmental health, and occupational health. Eleven of the twenty candidate courses selected for review completed the required steps of the review process. They were as follows:

Behavioral Science Specialist
(Army, 302-91G10)

Cardiopulmonary Laboratory Specialist
(Air Force, 3ALR91630)

Clinical Specialist
(Army, 300-91C20)

Medical Laboratory Procedures (Advanced)
(Army, 311-92B30)

Medical Laboratory Specialist (Basic)
(Army, 311-92B10)

Operating Room Specialist
(Army, 301-91D10)

Environmental Health Specialist (Air Force)
(Air Force, 5ABY90730)

Environmental Health Specialist (Army)
(Army, 322-91S10)

Environmental Protection
(Air Force, 5AZY907X0-1)

Radiological Safety
(Army, 7K-F3)

Safety Specialist
(Air Force, G30ZR8124X)

Nine of the twenty candidate courses were dropped from the review process for a variety of reasons. One course was removed from consideration following the preliminary military course materials review stage because subject matter reviewers felt the course was too military specific for use in vocational education:

Fundamentals of USAF Safety Programs
(Air Force, G30ZR8124X)

The eight remaining courses were dropped during the review process because major problems were encountered in acquiring the military course materials necessary for the review process. One course was omitted because no material had been received from the military source:

Dialysis Technician
(Army, 300-F2)

Two courses were not available for review because they were currently under revision by the military services:

Hospital Food Service Specialist
(Army, 800-94F20)

Optical Laboratory Specialist
(Army, 34-42E10)

The available curriculum materials for two other courses were judged to be incomplete based on analysis by project staff, and therefore, these courses were not subjected to the second phase of the review process:

Ophthalmology Surgical Technician
(Air Force, 5AZY91270)

Orthopedic Specialist
(Army, 304-91H20)

Three courses were determined to be lacking in necessary materials by subject matter and curriculum development specialists. Therefore, a valid curriculum review was not possible:

Hearing Conservation Program
(Air Force, 5AZY907X0-3)

Industrial Hygiene Measurements
(Air Force, 5AZY907X0-2)

Industrial Radiological Hazards
(Air Force, 5AZY907X0-4)

The eleven courses which completed the review process are described in Table I, Military Course Evaluation Summary: Complete Reviews. The nine courses which did not complete the review process are described in Table II, Military Course Evaluation Summary: Incomplete Reviews.

The factors described for each course were discussed earlier in the paper. The reviewers were able to make three judgments for the incomplete reviews based only on a review of the course outline: curriculum need, course goals/objectives, and overall evaluation. The ratings represented a synthesis of item responses and narrative comments of the reviewers. The factors are grouped into three categories according to importance in curriculum development or conversion: "critical," "important," and "nice-to-have." The rating of each factor indicates the potential for using that element of curriculum as a basis for development of materials for vocational education.

General Conclusions

Although the major objective of the research was to provide information on the feasibility of conversion for identified courses, it is possible to make some general conclusions based on the ratings of the completed reviews (see Table I).

- o Military curricula are available to meet curriculum needs as indicated by the high ratings of the subject matter experts for the courses selected for review (factor 1).
- o Military curriculum development procedures generally do produce materials that have well-stated course goals and objectives. Also, the materials tend to meet those objectives adequately. This is indicated by the ratings for factors 2 and 5. However, additional curriculum development attention is needed with respect to lesson objectives (factor 3).
- o Reviewers indicate that the military courses examined demonstrate a high degree of technical accuracy in the instructional materials (factor 4).
- o Materials usually include a variety of relevant instructional strategies, but they often lack classroom management strategies (factor 6).

Table I
Military Course Evaluation Summary: Complete Reviews

	Evaluative Factors											
	Critical					Important				Useful		Overall Rating
	(1) Curriculum Need	(2) Course Goals and Objectives	(3) Lesson Objectives	(4) Technical Accuracy of Instructional Materials	(5) Material Adequacy to Meet Objectives	(6) Instructional and Management Strategies	(7) Ease of Adaptation	(8) Incorporation of Special Needs	(9) Absence of Copyrighted Materials	(10) Assessment and Evaluation Criteria	(11) Safety and Other Job Attitudes	
Military Courses												
<u>Allied Health</u>												
1. Behavior Science Specialist	Moderate	Moderate	Weak	Strong	Strong	Weak	Weak	Weak	Strong	Weak	Moderate	Strong
2. Cardiopulmonary Laboratory Specialist	Strong	Strong	Moderate	Moderate	Moderate	Moderate	Weak	Weak	Strong	Weak	Moderate	Strong
3. Clinical Specialist	Weak	Moderate	Moderate	Strong	Moderate	Moderate	Moderate	Weak	Strong	Weak	Moderate	Moderate
6. Medical Laboratory Procedures (Adv)	Strong	Strong	Moderate	Strong	Strong	Moderate	Strong	Weak	Strong	Weak	Weak	Strong
7. Medical Laboratory Specialist (Basic)	Strong	Strong	Moderate	Strong	Strong	Moderate	Strong	Weak	Strong	Weak	Weak	Strong
8. Operating Room Specialist	Strong	Strong	Weak	Strong	Strong	Moderate	Strong	Weak	Strong	Weak	Strong	Strong
<u>Environmental Health</u>												
12. Environmental Health Specialist (AF)	Moderate	Strong	Weak	Strong	Moderate	Moderate	Weak	Weak	Moderate	Weak	Moderate	Moderate
13. Environmental Health Specialist (Army)	Weak	Moderate	Weak	Weak	Strong	Moderate	Weak	Weak	Strong	Weak	Moderate	Weak
14. Environmental Protection	Strong	Moderate	Moderate	Moderate	Strong	Moderate	Moderate	Weak	Moderate	Weak	Moderate	Moderate
<u>Occupational Safety and Health</u>												
19. Radiological Safety	Strong	Strong	Moderate	Strong	Strong	Moderate	Moderate	Weak	Strong	Weak	Moderate	Strong
20. Safety Specialist	Strong	Strong	Strong	Moderate	Moderate	Moderate	Moderate	Weak	Strong	Moderate	Moderate	Moderate

Table II

Military Course Evaluation Summary: Incomplete Reviews

Military Course	Preliminary Military Course Materials Review	Reasons for Not Responding
4. Dialysis Technician	. Strong curriculum need . Strong relevant objectives . Strong overall evaluation	Material on order but not received
5. Hospital Food Service Specialist	. Moderate curriculum need . Moderate relevant objectives . Moderate overall evaluation	Material currently being revised by military
9. Ophthalmology Surgical Technician	. Strong curriculum need . Moderate relevant objectives . Moderate overall evaluation	Inadequate materials received for review based on staff assessment
10. Optical Laboratory Specialist	. Strong curriculum need . Moderate relevant objectives . Strong overall evaluation	Material currently being revised by military
11. Orthopedic Specialist	. Moderate curriculum need . Moderate relevant objectives . Moderate overall evaluation	Inadequate materials received for review based on staff assessment

Table II (Continued)

Military Course Evaluation Summary: Incomplete Reviews

Military Course	Preliminary Military Course Materials Review	Reasons for Not Responding
15. Fundamentals of USAF Safety Programs	. Moderate curriculum need . Weak non-relevant objectives . Weak overall evaluation	Material highly military-specific based on reviewer's assessment
16. Hearing Conservation Program	. Strong curriculum need . Strong relevant objectives . Strong overall evaluation	Inadequate material received for review based on reviewer's assessment
17. Industrial Hygiene Measurements	. Strong curriculum need . Strong relevant objectives . Strong overall evaluation	Inadequate material received for review based on reviewers' assessment
18. Industrial Radiological Hazards	. Strong curriculum need . Strong relevant objectives . Strong overall evaluation	Inadequate material received for review based on reviewers' assessment

- o The consistently weak ratings for factor 8, incorporation of special needs, indicate that none of the military curricula reviewed were developed to accommodate specific needs of special students. Nonetheless, many military materials developed can be adapted for use by students with various special needs.
- o Reviewers indicated that little or no copyrighted materials are incorporated in a majority of the instructional materials. This seems to reflect the military's efforts to eliminate copyrighted materials from their courses of study (factor 9).
- o Evaluation criteria and testing materials generally are not included in military instructional materials. Tests and assessment procedures do exist at training sites. However, those materials are usually not available for review (factor 10).
- o Many of the job attitudes discussed in the curriculum are military-specific. Job attitude materials will have to be developed for civilian related situations.

The overall good evaluation of the military curricula indicate that it is feasible to convert military curricula for use in the civilian sector. It is strongly suggested, however, that each course be carefully evaluated on its own merits. This caution in no way reflects on the quality of the curricula for training military personnel, the intended audience. There are some differences (not weaknesses), which may require additional modification to make the curricula more specifically useful for the civilian sector. For example, the Instructional and Management Strategies component of the military materials is designed to be used with strict adherence to proven instructional and management strategies. Prior to assignment as instructors, military personnel complete rigorous training and pass review by a "murder board" of trained instructors. Since all military instructors complete rigorous training prior to actual assignment, limited instructional and management strategies are incorporated into the actual curriculum for a given course of instruction. Strategies would have to be developed or incorporated into the curriculum for use in the civilian sector.

The military is proving a good source of curricula for conversion to civilian use. With the advent of core courses being developed by cooperatively two or three branches of the military and the continuing elimination of copyrighted materials, the military as a civilian curriculum source shows even more promise.

It was the general consensus of the project staff and consultants that military curricula should continue to be reviewed on a regular basis for possible conversion for civilian use.

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